an acquired image. That acquired image may be in substitution for or supplemental to an acquired image generated from illumination in the visible spectrum. In a particular embodiment, the conditioning component provides for selective conditioning of at least one of an acquired image, an output image and an intermediate image based on the radiation-based acquired. At the same time, the conditioning component typically conditions on bases other than the radiation-based acquired image.

Persons skilled in the art will recognize the foregoing description and embodiments are not limitations, but examples. It will be recognized by persons skilled in the art that many modifications and variations are possible in the details, materials, and arrangements of the parts and steps which have been described and illustrated in order to explain the nature of this invention, and that such modifications and variations do not depart from the spirit and scope of the teachings and claims contained herein. --

IN THE DRAWINGS

Revise Figures 12(a), 12(b), 13(a), 13(b), 15(a), 15(b), 15(c) and 18 as shown in red ink on the attached sheets.

Add new Figure 22.

IN THE CLAIMS

Please cancel claims 4-15, 19, 23 and 27-34, without prejudice.

Please amend claims 24-26, as follows:

24. (Amended) A medical imaging system comprising:

an endoscope having a proximal end and a distal end;

a light guide [located within the endoscope and extending from the proximal end to the distal end of the endoscope], said light guide [having a light post at its proximal end which is] being adapted to receive light energy [from a light source], to transmit [the] light energy therealong, and to direct the light energy from its distal end so as to illuminate [an operative] a target site;

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an optical image transferring [member] structure located within the endoscope and extending from the proximal end to the distal end of the endoscope;

[a light source operatively connected to the light post to apply light energy to the light guide;]

a video sensor operatively coupled to the optical image transferring structure at the distal end of the endoscope for imaging an optical image of the target site, the optical image having differential picture brightness due to uneven illumination of the target site;

a compensating apparatus operatively coupled to said video sensor, the compensating apparatus comprising

a sawtooth wave generator for generating a sawtooth waveform having a controlled amplitude and at least one of a predetermined rising slope[,] and a predetermined falling slope [and a controlled amplitude];

a [parabola] parabolic wave generator for generating a [parabola] parabolic waveform having a controlled amplitude and orientation; and

an adder operatively coupled to said sawtooth wave generator, said

parabolic wave generator and a video signal, the adder [for] adding said sawtooth waveform, said parabolic waveform and said video signal to produce a compensating video signal [used as an input to]; and

a video signal processor coupled to the compensating apparatus so as to receive the compensating video signal, the compensating video signal adjusting [its] the video signal processor's gain both vertically and horizontally, such that the video signal is compensated by increasing the gain of the video signal representing that part of the optical image which is less bright than a reference and reducing the gain of the video signal representing that part of the optical image which is brighter than a reference, so as to facilitate production of a compensated video signal [compensating said video signal to represent an image having a substantially uniform brightness].

25. (Amended) The system of claim [23] 24, wherein said light guide is a fiber optic light guide disposed in the endoscope, said light guide resulting in [and the] differential picture brightness [is] so that the optical image is brighter at its center than at its edges, and wherein said compensating apparatus produces a compensating [video] signal used as an input to [a] the video signal processor, the compensating signal adjusting [its] the video signal processor's gain both vertically and horizontally, such that the video signal is compensated by increasing, in response to the sawtooth waveform, the gain of the video signal [in response the sawtooth waveform] representing the periphery of the optical image and reducing, in response to the parabolic waveform, the gain of the video signal [in response to the parabolic waveform] representing the center of the optical image [compensating said video signal to represent an optical image having a substantially flat brightness].

26. (Amended) The system of claim [23] 24, further comprising

an amplifier for amplifying the compensated video signal; and

a sensing device operatively coupled to the amplifier for receiving the compensated video signal and for sensing and removing noise therefrom.

Please add new claims 35 through 102:

--35. An endoscope, comprising:

an elongate housing having a proximal end and a distal end;

a light guide extending from the proximal end to the distal end of the housing, said light guide being adapted to receive light energy, to transmit the light energy therealong and to direct the light energy from the distal end of the housing so as to illuminate a target site wherein the target site is illuminated with uneven illumination;

an optical image transferring structure extending from the proximal end to the distal end of the housing, the optical image transferring structure transferring an optical image of the illuminated target site to said proximal end;

a video sensor operatively coupled to the proximal end of the endoscope in association with the optical image transferring structure, the video sensor producing a video signal representing the optical image having differential picture brightness due to said uneven illumination;

a compensating apparatus operatively coupled to said video sensor, the compensating apparatus generating a compensating signal; and

an application component, coupled to the compensating apparatus to receive the compensating signal, the application component providing for application of the compensating signal to the video signal so as to produce a compensated video signal.

36. The endoscope of claim 35, wherein the application component comprises a multiplier that multiplies the compensation signal and the video signal to produce a compensated video signal having its gain both vertically and horizontally compensated by increasing the gain of the video signal representing that part of the optical image which is less bright than a reference and reducing the gain of the video signal representing that part of the optical image which is brighter than a reference.

37. The endoscope of claim 35, wherein the application component applies the compensation signal to control the processing of the video signal.

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38. An endoscope for imaging a target site, the target site being subject of non-uniform illumination, the endoscope having a proximal end and a distal end, comprising:

a video sensor producing a video signal representing an optical image of the target site;

a compensating apparatus operatively coupled to said video sensor, the compensating apparatus generating a compensating signal from at least part of the video; and

an application component coupled to the compensating apparatus to receive the compensating signal, the application component providing for application of the compensating signal to the video signal toward producing a compensated video signal.

39. The endoscope of claim 38 wherein the video sensor is disposed at the distal end of the endoscope.

40. The endoscope of claim 38, wherein the video sensor is disposed at the proximal end of the

endoscope and further comprising optical image transferring structure, the optical image transferring structure transferring an optical image of the illuminated target site from the distal end to said video sensor at the proximal end.

41. The endoscope of claim 38, wherein the compensating apparatus generates a digital compensating signal and the application component provides for applying the compensating signal digitally.

42. The endoscope of claim 38, wherein the compensating apparatus generates an analog compensating signal and the application component provides for applying the compensating signal digitally.

43. The endoscope of claim 38, wherein the compensating apparatus generates a compensating signal representing at least one parameter of a compensating waveform facilitating production of the compensated video signal.

44. The endoscope of claim 43, wherein the compensating apparatus and the application component are integral.

45. A video signal compensator for an endoscope comprising:

a compensating signal generator, the generator generating a compensating signal substantially representing at least one parameter of a compensating waveform for facilitating reduction of differential picture brightness of an optical image generated from an interior space as illuminated by an illumination system in an endoscope, the interior space being subject to uneven

illumination, and the optical image being represented in a video signal; and

an application component operatively coupled to said compensating signal generator and receiving as inputs the video signal and the compensating signal, the component applying the compensating signal with the video signal so that the video signal has its gain both vertically and horizontally compensated, including by at least one of increasing the gain of the video signal representing that part of the optical image which is less bright than a reference and of reducing the gain of the video signal representing that part of the optical image which is brighter than a reference, so as to produce a compensated video signal representing an image having a substantially uniform brightness.

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46. The video signal compensator of claim 44 wherein said compensating signal generator operates in the digital domain.

47. The video signal compensator of claim 44 wherein said compensating signal generator operates in the analog domain.

48. A medical instrument for use in imaging a target site in a medical procedure, the target site being subject to deficient illumination, and the target site having a target image selected respecting the deficient illumination, the medical instrument comprising:

an image acquisition component, the image acquisition component generating an acquired image of the target site;

an image output component, the image output component generating an output image of the

target site; and

a conditioning component, the conditioning component being coupled to at least one of the image acquisition component and the image output component, the conditioning component providing for selective conditioning of at least one of the acquired image, the output image and an intermediate image derived from one or more of such acquired and output images, so as to enhance correlation of the output image to the target image.

49. A medical instrument as claimed in claim 48, wherein the image acquisition component comprises at least one of a video sensor and an optical image transferring structure.

50. A medical instrument as claimed in claim 49, wherein the image output component comprises at least one of an output device, a photonic device and interface technologies.

51. A medical instrument as claimed in claim 50, wherein the conditioning component provides selectively for at least one of amplification, attenuation, filtering, mixing, adding, multiplying, interpolating, extrapolating, phase shifting and frequency shifting, such provision being to all or selected portions of at least one of the acquired image, the output image and the intermediate image.

52. A medical instrument as claimed in claim 48, wherein the conditioning component selectively reduces differential picture brightness across all or selected portions of the output image.

53. A medical instrument as claimed in claim 48, wherein the conditioning component provides

for conditioning by at least one of (i) selectively processing all or selected portions of at least one of the acquired image, the output image and the intermediate image, (ii) selectively controlling at least one the image acquisition component and the image output component, and (iii) a combination of such selective processing and controlling.

54. A medical instrument as claimed in claim 53, wherein the conditioning component processes or controls by providing selectively for at least one of amplification, attenuation, filtering, mixing, adding, multiplying, interpolating, extrapolating, phase shifting and frequency shifting, such provision being to all or selected portions of at least one of the acquired image, the output image and the intermediate image.

55. A medical instrument as claimed in claim 53, wherein the image acquisition component has an acquisition area and has brightness sensitivity that is controllable as a function of acquisition area position, and wherein the conditioning component conditions the acquired image by selectively controlling the brightness sensitivity of the image acquisition component.

56. A medical instrument as claimed in claim 53, wherein the image output component has an output space and has brightness sensitivity that is controllable as a function of position in the output space, and wherein the conditioning component conditions the output image by selectively controlling the brightness sensitivity of the image output component.

57. A medical instrument as claimed in claim 53, wherein the conditioning component is integral, in whole or part, with at least one of the image acquisition component and the image output component.

58. A medical instrument as claimed in claim 48, wherein the conditioning component provides selectively for at least one of amplification, attenuation, filtering, mixing, adding, multiplying, interpolating, extrapolating, phase shifting and frequency shifting, such provision being to all or selected portions of at least one of the acquired image, the output image and the intermediate image.

59. A medical instrument as claimed in claim 48, wherein the image acquisition component has an acquisition area and has brightness sensitivity that is controllable as a function of acquisition area position, and wherein the conditioning component conditions the acquired image by selectively controlling the brightness sensitivity of the image acquisition component.

60. A medical instrument as claimed in claim 59, wherein the conditioning component is integral, in whole or part, with the image acquisition component.

61. A medical instrument as claimed in claim 48, wherein the image output component has an output space and has brightness sensitivity that is controllable as a function of position in the output space, and wherein the conditioning component conditions the output image by selectively controlling the brightness sensitivity of the image output component.

62. A medical instrument as claimed in claim 61, wherein the conditioning component is integral, in whole or part, with the image output component.

63. A medical instrument as claimed in claim 48, wherein the conditioning component is integral,

in whole or part, with at least one of the image acquisition component and the image output component.

64. A medical instrument as claimed in claim 48, wherein the image acquisition component generates the acquired image so as to comprise at least one of an optical signal and an electrical signal, and the conditioning component provides for conditioning of at least one of said signals.

65. A medical instrument as claimed in claim 48, wherein the image output component generates an output image comprising at least one of an optical signal and an electrical signal, and the conditioning component provides for conditioning of at least one of said signals.

66. A medical instrument as claimed in claim 48, wherein the conditioning component conditions in at least one of the digital and analog domains.

67. A medical instrument as claimed in claim 48, wherein the conditioning component provides for conditioning based on at least one of calibration previous to the medical procedure, manual calibration performed one or more times during the medical procedure, automatic calibration performed at regular intervals during the medical procedure, automatic calibration performed at intervals during the medical procedure based on selected triggering events, and dynamic calibration performed during the medical procedure.

68. A medical instrument as claimed in claim 67, wherein the conditioning component provides for conditioning based on calibration responsive to empirical information relevant to the medical procedure.

69. A medical system for use in imaging a target site in a medical procedure, the target site being subject to deficient illumination, and the target site having a target image selected respecting the deficient illumination, the medical system comprising:

an image acquisition component, the image acquisition component generating an acquired image of the target site;

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an image output component, the image output component generating an output image of the target site; and

a conditioning component, the conditioning component being coupled to at least one of the image acquisition component and the image output component, the conditioning component providing for selective conditioning of at least one of the acquired image, the output image and an intermediate image derived from one or more of such acquired and output images, so as to enhance correlation of the output image to the target image.

70. A medical system as claimed in claim 69, wherein the image acquisition component comprises at least one of a video sensor and an optical image transferring structure.

71. A medical system as claimed in claim 70, wherein the image output component comprises at least one of an output device, a photonic device and interface technologies.

72. A medical system as claimed in claim 71, wherein the conditioning component provides

selectively for at least one of amplification, attenuation, filtering, mixing, adding, multiplying, interpolating, extrapolating, phase shifting and frequency shifting, such provision being to all or selected portions of at least one of the acquired image, the output image and the intermediate image

73. A medical system as claimed in claim 69, wherein the conditioning component selectively reduces differential picture brightness across all or selected portions of the output image.

74. A medical system as claimed in claim 69, wherein the conditioning component provides for conditioning by at least one of (i) selectively processing all or selected portions of at least one of the acquired image, the output image and the intermediate image, (ii) selectively controlling at least one the image acquisition component and the image output component, and (iii) a combination of such selective processing and controlling.

75. A medical system as claimed in claim 74, wherein the conditioning component processes or controls by providing selectively for at least one of amplification, attenuation, filtering, mixing, adding, multiplying, interpolating, extrapolating, phase shifting and frequency shifting, such provision being to all or selected portions of at least one of the acquired image, the output image and the intermediate image.

76. A medical system as claimed in claim 74, wherein the image acquisition component has an acquisition area and has brightness sensitivity that is controllable as a function of acquisition area position, and wherein the conditioning component conditions the acquired image by selectively controlling the brightness sensitivity of the image acquisition component.

77. A medical system as claimed in claim 74, wherein the image output component has an output space and has brightness sensitivity that is controllable as a function of position in the output space, and wherein the conditioning component conditions the output image by selectively controlling the brightness sensitivity of the image output component.

78. A medical system as claimed in claim 74, wherein the conditioning component is integral, in whole or part, with at least one of the image acquisition component and the image output component.

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79. A medical system as claimed in claim 69, wherein the conditioning component provides selectively for at least one of amplification, attenuation, filtering, mixing, adding, multiplying, interpolating, extrapolating, phase shifting and frequency shifting, such provision being to all or selected portions of at least one of the acquired image, the output image and the intermediate image.

80. A medical system as claimed in claim 69, wherein the image acquisition component is implemented as part of a medical imaging instrument and separate from the medical imaging instrument is at least one of the image output component and the conditioning component.

81. A medical system as claimed in claim 80, wherein the image output component is an interface technology which connects the medical imaging instrument with, separate from the medical imaging instrument, at least one output device, photonic device and interface technology.

82. A medical system as claimed in claim 69, wherein the image acquisition component, the image output component, and the conditioning component are integrated in a medical imaging instrument, and wherein the image output component is an interface technology which connects the medical imaging instrument with, separate from the medical imaging instrument, at least one output device, photonic device and interface technology.

83. A method for use in imaging a target site in a medical procedure, the target site being subject to deficient illumination, and the target site having a target image selected respecting the deficient illumination, the method comprising:

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generating an acquired image of the target site;

generating an output image of the target site; and

conditioning at least one of the acquired image, the output image and an intermediate image derived from one or more of acquired and output images, so as to enhance correlation of the output image to the target image.

84. A method as claimed in claim 83, wherein the conditioning is provided selectively via at least one of amplification, attenuation, filtering, mixing, adding, multiplying, interpolating, extrapolating, phase shifting and frequency shifting to all or selected portions of at least one of an acquired image, an output image and an intermediate image.

85. A method as claimed in claim 83, wherein the conditioning selectively reduces differential

picture brightness across all or selected portions of an output image.

86. A method as claimed in claim 83, wherein the conditioning is provided by at least one of (i) selectively processing all or selected portions of at least one of an acquired image, an output image and an intermediate image, (ii) selectively controlling at least one of the generating of an acquired image and the generating of an output image, and (iii) a combination of such processing and controlling.

87. A method as claimed in claim 86, wherein the processing or controlling is effected by providing selectively for at least one of amplification, attenuation, filtering, mixing, adding, multiplying, interpolating, extrapolating, phase shifting and frequency shifting to all or selected portions of at least one of an acquired image, an output image and an intermediate image.

88. A method as claimed in claim 86, wherein controlling the generating of an acquired image contemplates using an acquisition area having a brightness sensitivity that is controllable as a function of the acquisition area position, and wherein the conditioning of the acquired image comprises selectively controlling the brightness sensitivity respecting the acquisition area position.

89. A method as claimed in claim 86, wherein controlling the generating of an output image contemplates using an output space having a brightness sensitivity that is controllable as a function of position in the output space, and wherein the conditioning of the output image comprises selectively controlling the brightness sensitivity respecting the output area position.

90. A method as claimed in claim 83, wherein generating an acquired image contemplates using

an acquisition area having a brightness sensitivity that is controllable as a function of the acquisition area position, and wherein the conditioning of the acquired image comprises selectively controlling the brightness sensitivity respecting the acquisition area position.

91. A method as claimed in claim 83, wherein generating an output image contemplates using an output space having a brightness sensitivity that is controllable as a function of position in the output space, and wherein the conditioning of the output image comprises selectively controlling the brightness sensitivity respecting the output space position.

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92. A method as claimed in claim 83, wherein the generating of an acquired image comprises generating at least one of an optical signal and an electrical signal, and wherein the conditioning is of at least one of said signals.

93. A method as claimed in claim 83, wherein the generating of an output image comprises generating at least one of an optical signal and an electrical signal, and wherein the conditioning is of at least one of said signals.

94. A method as claimed in claim 83, wherein the conditioning is performed in at least one of the digital and analog domains.

95. A method as claimed in claim 83, wherein the conditioning is based on at least one of calibration previous to the medical procedure, manual calibration performed one or more times during the medical procedure, automatic calibration performed at regular intervals during the medical procedure, automatic calibration performed at intervals during the medical procedure based

on selected triggering events, and dynamic calibration performed during the medical procedure.

96. A method as claimed in claim 95, wherein the conditioning is based on calibration responsive to empirical information relevant to the medical procedure.

97. A medical system for use in imaging a target site in a medical procedure, the target site being subject to deficient illumination, and the target site having a target image selected respecting the deficient illumination, the target image having an energy profile, the medical system comprising:

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an image acquisition component, the image acquisition component generating an acquired image of the target site, the acquired image having an energy profile;

an image output component, the image output component generating an output image of the target site, the output image having an energy profile; and

a conditioning component, the conditioning component being coupled to at least one of the image acquisition component and the image output component, the conditioning component providing for selective conditioning of the energy profile of at least one of the acquired image, the output image and an intermediate image derived from one or more of such acquired and output images, so as to enhance correlation of the energy profile of the output image to energy profile of the target image in connection with and to improve performance in the medical procedure.

98. A medical system as claimed in claim 97, wherein the target site is illuminated, at least in part, using signals other than visible light, and wherein the image acquisition component generates